1. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = x^3 - 3x^2 - 2x + 1 \text{ and } g(x) = 4x^3 + 4x^2 - x$$

   A. $(f \circ g)(-1) \in [9.3, 10.38]$
   B. $(f \circ g)(-1) \in [-3.32, -2.98]$
   C. $(f \circ g)(-1) \in [1.64, 2.57]$
   D. $(f \circ g)(-1) \in [-0.35, 1.66]$
   E. It is not possible to compose the two functions.

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2. Determine whether the function below is 1-1.

$$f(x) = 36x^2 + 480x + 1600$$

   A. No, because there is a y-value that goes to 2 different x-values.
   B. Yes, the function is 1-1.
   C. No, because the domain of the function is not $(-\infty, \infty)$.
   D. No, because the range of the function is not $(-\infty, \infty)$.
   E. No, because there is an x-value that goes to 2 different y-values.

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3. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-4x + 11} \text{ and } g(x) = 6x + 4$$

   A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-0.25, 5.75]$
   B. The domain is all Real numbers except $x = a$, where $a \in [-6.8, -0.8]$
   C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-12.4, -2.4]$
   D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-9.4, -1.4]$ and $b \in [2.33, 14.33]$

E. The domain is all Real numbers.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = e^{x-5} + 2$$

A. $f^{-1}(10) \in [3.11, 3.77]$

B. $f^{-1}(10) \in [6.93, 7.45]$

C. $f^{-1}(10) \in [-2.94, -2.59]$

D. $f^{-1}(10) \in [4.02, 4.57]$

E. $f^{-1}(10) \in [4.57, 4.97]$

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5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^-1(-13)$ belongs to.

$$f(x) = \sqrt[3]{3x + 5}$$

A. $f^{-1}(-13) \in [722.67, 732.67]$

B. $f^{-1}(-13) \in [734, 740]$

C. $f^{-1}(-13) \in [-735, -733]$

D. $f^{-1}(-13) \in [-732.67, -723.67]$

E. The function is not invertible for all Real numbers.

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6. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 - 1x^2 + 4x - 4 \text{ and } g(x) = -2x^3 + x^2 + 2x + 1$$

A. $(f \circ g)(1) \in [15, 25]$

B. $(f \circ g)(1) \in [-8, -5]$

C. $(f \circ g)(1) \in [-1, 3]$

D. $(f \circ g)(1) \in [23, 36]$

E. It is not possible to compose the two functions.

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7. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 8x^4 + 8x^3 + 4x^2 + x \text{ and } g(x) = \frac{5}{5x + 22}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-6.4, 0.6]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8.33, -0.33]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.17, 6.83]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [3.67, 16.67]$ and $b \in [-9.17, -5.17]$

E. The domain is all Real numbers.

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8. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x+2} + 5$$

A. $f^{-1}(8) \in [6.73, 6.89]$

B. $f^{-1}(8) \in [7.35, 7.89]$

C. $f^{-1}(8) \in [-1.17, -0.58]$

D. $f^{-1}(8) \in [2.92, 3.25]$

E. $f^{-1}(8) \in [6.92, 7.48]$

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9. Determine whether the function below is 1-1.

$$f(x) = 20x^2 - 68x - 736$$

A. Yes, the function is 1-1.

B. No, because the domain of the function is not $(-\infty, \infty)$.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

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10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -10$ and choose the interval that $f^-1(-10)$ belongs to.

$$f(x) = 4x^2 - 5$$

A. $f^{-1}(-10) \in [1.26, 2.12]$

B. $f^{-1}(-10) \in [2.98, 3.66]$

C. $f^{-1}(-10) \in [1.05, 1.21]$

D. $f^{-1}(-10) \in [3.84, 4.42]$

E. The function is not invertible for all Real numbers.
